

# Co-management: transformation of community affair model in Chinese nature reserves

ZHANG Ming-hai, WANG Shuang-ling

*College of Wildlife Resources, Northeast Forestry University, Harbin 150040, P. R. China*

**Abstract:** This article analyzes the application of co-management in establishing and zoning nature reserves, explains two types of participatory models, explains the main content and steps required to implement a co-management program, and suggests future direction of co-management. In China, great progress has been achieved since 1956 when the first nature reserve was established. However, conflicts between nature reserve officials and community members, and differences between conservation and utilization of natural resources suggest that the traditional community affair model is unfit to some degree. A more workable and economically sustainable model is recommended. Co-management appears to be the preferred management model. International conservation organizations have carried out projects in Chinese nature reserves in recent years, and co-management is thought to be an effective approach to resolve conflicts coming from community and to improve nature reserves management.

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## Introduction

Nature reserves are established in order to protect biological diversity and representative landforms, as well as human landscapes. Nature reserves are required in the face of excessive utilization of natural resources and destruction of natural environment. Nature reserves intend to provide baseline for restoration of natural environment, utilization of genetic resources, scientific research, public awareness, and education. The first Chinese nature reserve was established in 1956, and up to now more than 1405 nature reserves have been established by State Forestry Administration whose areas amount to  $1.09 \times 10^8 \text{ hm}^2$ , in which 85% terrestrial ecosystems, 85% wild animal populations and 65% wild vegetation communities of China have been protected effectively. Nature reserves have been playing an important role in conservation of plant and animal populations, water and soil, and landscapes.

Traditional establishment and management model of nature reserves of China are based mainly on the theories coming from the Europe and North America. The earliest nature reserves were set aside in western countries, primarily the United States. At that time there was abundant, unoccupied land, low population, and a strong administrative structure. It was possible to organize a system of exclusive government jurisdiction, with effective controls over resources management and public education. In China, nature reserve policy stressed the same elements despite

higher population and less land available for designation, weaker government jurisdiction and a lack of history in conservation and natural resources management. Nature reserves establishment in China emphasized protection measures without considering management effectiveness and specific strategies. Consequently improvements in nature reserves management are required.

The present nature reserve network has made some achievements. Some international environmental conservation organizations have carried out research on nature reserves management of China for almost ten years in cooperation with the Chinese government. They have produced some valuable information about experience and methods. This article aims to probe application of co-management in nature reserves according to suggestions by some international environmental management organizations.

## Concept of co-management

Co-management intends to link conservation of biological diversity to local economic development. Theoretically it guarantees biodiversity conservation by coordinating nature reserve management with local social and economic activities (Cun 2001). Its core attempts to promote social and economic developments of communities around a neighboring nature reserve and deepen mutual understanding between nature reserve officials and community members in order to realize natural resources conservation and sustainable utilization. The most important and difficult task is to enable local people to participate in development projects and reasonably manage nature reserves.

The main strategy of co-management is to provide local community with feasible economic alternatives that help

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**Biography:** ZHANG Ming-hai (1961-), male, Professor in College of Wildlife Resources, Northeast Forestry University, Harbin 150040, P. R. China. (E-mail: zhangminghai2004@126.com)

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reduce its dependence on natural resources of the nature reserve. Some alternatives include demonstrating natural gas technology, developing non-timber forest products, ecotourism, and other sustainable consumption of resources (Cun 2001; Zhao 2002). In addition the community should be encouraged to actively participate in resources management, make decisions and other various activities that influence their life during the course of design, implementation and managements of nature reserve's projects.

Co-management of nature reserves intends to perform the functions of nature resources conservation, scientific research, community development and logistic service. Moreover nature reserves integrate with community around nature reserves, both of which compose a complex system of nature-society-economy by transfer and exchange of material flow, energy flow, information flow and species flow. Community participation in nature reserve management is theoretically substantial and significant (Zhou 1999).

### **Community participation in establishing and zoning nature reserves**

#### **Traditional establishment and zoning model of nature reserves**

In China, the traditional procedure for establishing nature reserves consists of three steps: 1) define areas of biotic, geologic or cultural value that are of representation, integrity and nature according to scientific survey, 2) designate a government agency to take charge of establishing nature reserves based on scientific survey demonstration and master planning, 3) establish nature reserves by way of enclosure and agency management of them.

Nature reserves are zoned into three functional categories: a **core zone** that is relatively pristine and undeveloped in which all human activities are prohibited; a **buffer zone** that is transitional between the pristine core and semi-developed experimental zones and limits human activities; and an **experimental zone** that permits appropriate activities of mixed farming, ecotourism and scientific survey. Conservation firstly dominates and utilization is secondary for nature reserves. This kind of zoning depends on integrating natural resources and adherence to external expert advice, without participation of local community and stakeholders. During the course of zoning nature reserves, local community and stakeholders are not consulted about management and usually are not permitted to express their suggestions and thoughts. From the beginning of establishing nature reserves local community and stakeholders are not regarded as main body of natural resources conservation.

In China, many nature reserves for protection of wildlife are located in regions where ethnic minorities predominate (Qian 2001). Historically, local people used and managed natural resources in traditional ways, which maintained a balance of natural resources. Many minorities' traditional cultures and regional beliefs indicate respect for nature,

such as Tibetan, Dulong, Dai, Miao, Dong and Yi minorities (Liu *et al.* 2000; Zhang *et al.* 2000; Zhao 2002). Their utilization patterns reflect particular and pertinent conservation consciousness. Scholars continue to study rustic cultures of minorities (He *et al.* 2000). Traditional production and living patterns of local community indicate sustainable utilization and conservation of natural resources. However community participation is diminished when nature reserves are established and zoned. Local suggestions are ignored and conflicts are not resolved, which leads to local community failing to understand function of zones, the value of nature resources, the role of management models, and natural resources to be permitted utilization (Wang 1998), or no apparent change of previous production and living patterns to meet management demand of nature reserves even if community has some understanding. These drawbacks provoke various conflicts between community inside or around nature reserve and management department of nature reserve, principally embodying in resources conservation and utilization, which is a common and outstanding problem of nature reserves management in China.

#### **Participatory establishment and zoning method of nature reserves**

During the course of participatory establishment and zoning of nature reserves, the first step is to conduct biodiversity survey in areas to be established by designated charge departments of nature reserves, and to make preliminary zoning proposal by biodiversity experts.

Secondly comment and opinions from a wide range of interests are collected about preliminary zoning proposal. The scope is widely involved in those departments that relate to establishment of nature reserves and utilization of natural resources, but the keystone is to collect points and opinions of local people based on understanding their production and living patterns. The strictly controlled core zone should be given special attention because its zoning could change the traditional utilization customs of local people over nature resources.

A full negotiation and planning course is needed after collecting points and opinions. As for natural resources that can be utilized in a sustainable way, a detailed sustainable utilization action is designed on the premise of full community participation. The community is the main implementing and monitoring body. As for natural resources traditionally utilized by community, zoning proposal can be adjusted or some compensation should be given and substitute livelihood program should be designed. Based on full respect to community demand and benefit, the resources utilization agreement should be reached.

Finally, resources survey report and zoning proposal about proposed nature reserve are both submitted to local government entitled to examination and approval power after the community reaches final agreement with modified zoning proposal of nature reserves.

The whole course of participatory zoning of nature re-

serves is one of adequate consultation, coordination and communication with community with an exception of resources distribution survey and authority demonstration of biodiversity. Adjusted or compensatory measures or actions should be attached to final version of zoning proposal of nature reserves. By this way community realizes itself important role of nature resources conservation, which will reduce evidently resources utilization conflicts and create a good atmosphere for nature reserves management.

## **Transformation of community affair model of nature reserves**

### **Current community affair model of nature reserves in China**

Traditional community affair model of nature reserves consists of police enforcement and execution of law, patrolling, scientific research and monitor, mixed farming (including ecotourism) and environmental public awareness and education. This compulsory management model requires a superior to subordinate relationship between members of the community and the nature reserve administration. It has simple and define management goal, fitting some nature reserves managed straightforward, few people and strong economy (Han 2000). There are fewer nature reserves in eastern developed regions and more in western poor and mountainous region in China (Qian 2001). Since most finance comes from local governments, management levels are different very much in different nature reserves because of difference of local economy. This traditional model leads to discontent and little effectiveness on management than it should be. On the contrary, participatory community model is active and flexible.

Presently imbalance arises between increasing number and improvement in management level of nature reserves. A third of nature reserves have dysfunctional institutions and the other third has no institution (Zhu *et al.* 1996). Due to dysfunctional institution, lack of staff and ability, shortage of civil-work and equipments, nature reserves run short of management level, and related conservation & scientific research and public awareness & education are limited, which results in malfunction of nature reserves and discordance between social benefit and economic benefit (Yang 1999; Yu *et al.* 2003). In addition, local community is passive or even hostile because of compulsory management of nature reserve, which leads to conflicts between function performance of nature reserve and economic development of local community. For example, in the face of illegal cases by local villager, nature reserves only dispose and monitor them, instead of careful considering the hidden reasons of the illegal actions. Nature reserves fail to obtain understanding and support from local community, so illegal cases still appear. Another example, some nature reserves give up their rights and functions in order to compromise with strong local governments when conflicts rise between local economic development and conservation of nature

reserves, which reflects an important drawback of community management of nature reserves.

### **Participatory community affair model**

#### *Understanding function of community and stakeholders in natural resources conservation*

Understanding function and role of community and stakeholders in natural resources conservation is important before starting participatory community affair model.

Firstly, biodiversity and ecological environment protected by nature reserves always are significant to a region, country and even the whole world. Beneficiary includes not only community inside and around the nature reserve but also outer areas. However once environment deteriorates, the first and direct victim is local community and people, so community should benefit more because they are at a higher risk. But they burden more obligation and responsibility.

Secondly, they form a habit of depending on natural resources because of bad existing conditions. In order to protect human environment, local people are forbidden to collect natural resources that they depend without compensation, which limits their living sources. Their living standard is lower than that before establishing nature reserve because substitute economy or compensation is not given in time.

Thirdly, historically local people have kept a life-and-death relationship with natural resource. Their production pattern and traditional culture emphasize on sustainable utilization of resources. So they pay more attention to care for environmental quality than outside. However most nature reserves administrations don't realize it and communicate with community poorly, which leaves hidden conflicts. Natural resources conservation will be improved to a higher level and department of nature reserve management will obtain understanding and support from local community and stakeholder if community participation has been increased.

#### *Main models of participatory community affair in China*

At present there are two kinds of participatory community management models in China. One is to establish uniform in situation between nature reserve management institution and local government, bringing nature conservation into management system of local government. Such examples include Wolong National Nature Reserve in Sichuan, Shennongjia National Nature Reserve in Hubei and Hupingshan National Nature Reserve in Hunan. Another is the community-based conservation model between nature reserves and local community based on an agreement about utilization and management of natural resources by full consultation and negotiation. Such examples are Wuyishan National Nature Reserves in Fujian (Li 2001; Zhou 1999).

The level of participatory management is different because every nature reserve has itself specific conditions. In

China, most of nature reserves sponsored by international projects take community co-management. Examples include Taibai National Nature Reserve in Shanxi sponsored by GEF (Global Environment Facility), Wanglang National Nature Reserve in Sichuan sponsored by WWF (World Wild Fund for nature), Caohai National Nature Reserve in Guizhou sponsored by ICF (International Crane Fund). Community co-management is shown to be an effective management model by tentative practice in more than ten nature reserves. These mitigate utilization pressure and conflicts between nature reserves and community, and improve natural resources conservation level and local economic development (He *et al.* 2003; Ren *et al.* 2001; Wu *et al.* 2003; Zhang *et al.* 2000).

#### *Main tools of participatory community affair*

Participation runs through the whole course of co-management, such as information collection, coordination, negotiation, making decision, allied action and evaluation. It is important to take effective participatory tools for promoting participation of community and harmonizing relationship between nature reserve and local community. The familiar tools include silviculture system research, rapid rural appraisal (RRA), participatory rural appraisal (PRA), project planning and participatory environmental action planning. Main methods applied into nature reserves management include PRA, project period appraisal, analysis of strength, weakness, opportunity and threaten (SWOT) (Ren *et al.* 2001; Ren & Huang, 2001; Ren *et al.* 2002). Whatever the tool is, its core emphasizes to induct community to participate nature reserve management and realizes that society cares for nature reserve management.

#### *Main contents and steps of co-management*

Co-management activities sponsored by different international projects have the similar contents and steps, so co-management of China Sustainable Forestry Development Project sponsored by GEF is taken an example to introduce main contents and steps.

##### (1) Establish and train leading group

Leading groups will be formed at county level to oversee the co-management process, composed of officials and staff from local government, nature reserve, and representatives from co-management communities. The tasks of leading group will be as followings:

- I guide the co-management approach, including preparing criteria for the selection of co-management demonstration sites;
- II coordinate technical advice, programs, and cooperation among various local government departments;
- III educate their own and other government agencies on co-management and conservation;
- IV resolve conflicts arising out of co-management;
- V provide guidance and clarity on policy issues;
- VI review and approve Community Resources Management Plans (CRMP) and community contracts.

##### (2) Conduct PRA baseline surveys

During project implementation, additional information will be required for preparation of nature reserve management plans and PRA surveys will include, at least, social and geographic setting of the community, community use of natural resources, rules and institutions for the use and management of natural resources and methods for solving conflicts over their use, and economic and social problems facing community and conflicts over the use of natural resources.

##### (3) Select co-management sites

Based on the results of the PRA surveys and discussion within the leading group, two co-management sites will be selected within each nature reserve. These sites should be relevant to the threats identified in the threats analysis of management planning. Criteria for the selection of these sites will be determined during project implementation and include:

- I proximity of the community to nature reserve core zone;
- II an assessment of the community
  - (a) pressure on nature reserve resources;
  - (b) potential benefits from the project;
  - (c) motivation for project participation;
  - (d) natural resource rights or boundaries;
  - (e) potential for changing existing natural resource use rights;
  - (f) existing level of cooperation with nature reserve.

Equitable access of the various ethnic groups to pilot co-management activities will be one of these criteria.

##### (4) Establish management forum in co-management villages

The village committee, with other farmer representatives (including natural village heads and at least one woman) and additional stakeholders included, becomes a management forum for implementing the co-management process. The management forum is expected to prepare the CRMP, to manage the Community Conservation Fund (CCF) and approve community conservation and development projects supported with its fund, to enforce rules and regulations of the CRMP, to resolve conflicts, and to monitor impacts of the CRMP and CCF. Management forums will be trained in planning, project management, budgeting, and transparent accounting in support of this role.

##### (5) Prepare Community Resource Management Plan (CRMP)

The CRMP results from participatory mapping exercises and discussions with stakeholders and contains a community-based natural resource use and protection program, proposals for economic activities that reduce the overuse of critical natural resources or provide alternative livelihoods for resources lost, and outlines the organizational structure and approach for managing the CRMP and the CCF. For example, some of the Sichuan Nature Reserves May Prepare (CRMPs) that propose actions to jointly management

pastures for wildlife and domestic livestock or Baishuijiang may decide to prioritize forest management for firewood in collective forests that are also critical habitats.

#### **(6) Establish and Manage the Community Conservation Fund (CCF)**

Funding will be provided for the establishment of CCF to support projects identified within the community that solve problems identified in the CRMP. The project will provide guidance and training to village management forum on management of these CCF and options for sustaining the fund for future projects, such as creating revolving loans.

Co-management is complemented by community conservation education programs, energy conservation, and provision of community training and forest-based technical extension programs.

#### *Community conservation education and public awareness*

The objective is to experiment with innovative approaches for informing and educating different target groups within communities about the functions, ecology, regulations, and problems of nature reserves and relationship and conflicts of people and nature reserves. Each nature reserve will prepare a Community Conservation Education (CCE) plan that will identify its goals and objectives, determine target audiences and their characteristics, arrange messages and themes, determine methods of delivery, and prepare action plans.

#### *Energy conservation*

This activity should support an assessment of forest-based household fuel demand and demonstration of energy saving technologies appropriate to local demands and conditions that are cost-effective, culturally appropriate, and practical. Energy efficient technologies should be demonstrated for households in the co-management communities and other representative communities surrounding the nature reserve.

#### *Wildlife management system for mitigation of negative impacts of nature reserve on local community*

In order to address wildlife-related crop damage, the project should sponsor a workshop at which the lessons should be discussed. The assessment exercise would identify sites in each of the project nature reserves where wildlife-related crop damage is most acute and find mutually agreed solutions to mitigate negative mutual impacts. Potential solutions include the development of a system of community patrols, the use of chemical repellants, and digging trenches.

#### *Improving delivery of sustainable technologies and enhancing community skills.*

Cultivation techniques for non-timber forestry products (bamboo, rattan, medicinal plants or fungi) are provided to township technicians and rural households where reliable market opportunities exist for cultivated products. Women's

training needs and preferred training methods will be specifically surveyed and addressed. Close co-operation with the Natural Forestry Management can be needed to exchange lessons to develop a joint approach.

#### **Application of co-management in natural resources conservation**

Participatory co-management usually branches into many aspects of nature reserves management and breaks up traditional locked management model. Management department of nature reserve executes better administrative function because of the participation of local community and enlarges democratic scope. Hiring local people as patroller helps to resolve the problem of few workers and larger area of nature reserves when patrol. Participatory survey can help to get detailed data as accurate as possible in a short time at limited expense (Wu 1997). Participatory methods can be applied into the mass to understand poaching form and its reason, by which effective measures are taken to improve local economic structure and production pattern (Ran *et al.* 2001). Nature reserves staff are trained in not only professional skills but also general knowledge of management and economics. Concept and method of participation should be introduced to meet new management demand. Nature reserve should consider community benefit when it earns money. If permitted, some resources such as forestry and land can be assigned to local people in a form of contract, which not only increases local people's income but also entitles responsibility of supervising and conserving resources to local people. Nature reserves and community have each advantage and drawback when they develop mixed farming, which offer a sound reason to combine both to overcome each drawback and develop each advantage to achieve double benefits (Li 2002). For example, tourists can taste rich folk-custom culture, as well as enjoy charming and gentle nature scene, if nature reserves combine with local traditional culture when carry on ecotourism, moreover both can get much benefit. An important step is to hear fully thoughts and suggestions from community during the course of monitoring and evaluation. By adequate communication, development status of local community and work progress of nature reserve are learned, which makes a sufficient preparation for next phase.

#### **Potential development direction of co-management**

Participatory co-management can absorb more participatory organizations. For example, Chiulong-Nuiginy Petroleum Company in Papua New Guinea keeps a close touch with WWF and local people, forming conservative model of integrated conservation and utilization (Zhang *et al.* 2003). It is of important and realistic significance for consultation between nature reserves and community to encourage company and relevant media to join in nature resources conservation in different way.

In addition, many practical activities in Southeast Asia

more and more emphasize localization of participatory activity. By emphasis on special advantage, some regional characteristic methods should be discovered and applied into nature reserves management to facilitate co-management development.

## Conclusions

In China, because economic development is the primary issue of government, finance used for nature reserves is limited. The time is needed to resolve some problems of traditional management mechanism. Therefore it is realistic to seek workable and economic bearable model. Through nearly ten-year beneficial exploration of some international cooperation projects sponsored by different international conservation organizations, participatory co-management is thought to fit current development of nature reserves in China (Han 2000; Zhou 1996). Different nature reserve should apply flexibly model according to different development phrases to achieve management effectiveness of nature reserves and sustainable development of community.

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